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ABSTRACT

The performance of 9, 13, and 17 year old public and private school students, in reading and mathematics, was compared by analyzing data collected during the National Assessment of Educational Progress 1977-78 mathematics and 1979-80 reading assessments. Although results were averaged for the national population, separate data is available not only for the types of schools, but for region, race, sex, size and type of community. Mean national performance percentages indicate significant differences in favor of private schools in both reading and mathematics. After adjustment for the fact that schools serve unequal proportions of students from different socioeconomic background (by equating student populations for public and private schools), mean scores on the entire reading assessment differed three percentage points at age 9 and 13, and four points at 17 in favor of private schools. Differences in mathematics scores were statistically insignificant. It appears that on a national level: private schools perform better than public schools in reading and mathematics; the advantage may vary in different regions and for different student groups; and a significant portion of the advantage is accounted for by the different socioeconomic make-up of students attending private schools. Primary type of information provided by report: Results (Special Analyses). (Author/AEP)

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READING AND MATHEMATICS ACHIEVEMENT IN PUBLIC AND PRIVATE SCHOOLS:

IS THERE A DIFFERENCE?

A Special Analysis of the National Assessment Reading and Mathematics Data

No. SY-RM-50

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READING AND MATHEMATICS ACHIEVEMENT IN PUBLIC AND PRIVATE SCHOOLS: IS THERE A DIFFERENCE?

For many years, the National Assessment of Educational Progress (NAEP) has been collecting data about educational achievement in both public and private American schools. This paper compares public and private school pupils' performance in reading and mathematics using data gathered during the 1977-78 mathematics and 1979-80 reading assessments of 9-, 13- and 17-year-olds. The 1977-78 data and the portion of the 1979-80 data used in the reading change assessment indicate differences in both reading and mathematics performance, in favor of the private schools. However, when the data are adjusted to compensate for socioeconomic differences in the composition of private and public school student populations, national performance differences cease to be statistically significant.

When one examines the entire body of reading assessment data for 1979-80, which is based on a much larger number of performance exercises than the change assessment, the differences are more pronounced. Private school reading performance is better than public at all three ages, and the performance remains better even when one adjusts for the different composition of private and public school student populations.

Procedures

Readers not familiar with the National Assessment data base should consult the National Assessment procedural handbooks noted at the end of this paper. In brief, each assessment involved a national sample of students drawn from over 1,000 schools (see Table 5). The students' performance was assessed with hundreds of exercises spanning a wide range of reading and mathematics skills. The results were averaged for national populations of 9-, 13- and 17-year-olds and for various subgroups of young people, such as blacks, whites, males, females and people living in various regions and communities. The means for public school students were compared with the means for private school students to get the figures presented in the following tables as "public/private differences." A positive difference is a difference in favor of private school students; a negative difference is in favor of public school students.

The differences recorded on Tables 2-4 partly reflect the fact that public schools serve a somewhat different body of students than private schools. As Table 1 reveals, public, private-Catholic and private-non-Catholic school populations contain different proportions of students from various socioeconomic backgrounds. For instance, 11% of the 13-year-olds in the public schools come from homes in which neither parent finished high school; the proportion of such students in Catholic schools is only 4%, and in non-Catholic private schools, it is less than 1%. Conversely, 46% of the students in the public schools have parents with post-high-school education. But the proportion of such students in Catholic schools is 59% and in private non-Catholic schools, 71%. Similar proportions exist for other indicators of socioeconomic status such as the advantaged-urban and disadvantaged-urban categories. While a third to more than half of the students in private schools live in advantaged areas, only 7% of the public school students do. Clearly, the private schools contain a much higher proportion of students from backgrounds known to be associated with high academic performance. What would happen if public schools dealt with the same proportions of high- and low-socioeconomic students found in the private schools?

To estimate what the results might be, private Catholic and private non-Catholic schools were combined to create the "private" category. (There are too few non-Catholic private schools in the sample to justify reporting their results separately.) Then, the populations were equated so that both public and private populations shared equal proportions of students from various socioeconomic strata. The results appear in Tables 2-4 as "adjusted" differences.

TABLE 1. Estimated Percent of Public and Private Students by Selected Reporting Groups, Age 13, 1980

	Public	Private Catholic	Private Non-Catholic	All
Parental education				
Not graduated high school	10.9%	3.8%	0.3%	9.9%
Graduated high school	32.3	29.1	20.3	31.6
Post high school	46.3	59.1	71.1	48.2
Unknown	10.6	8.0	8.3	10.3
Total	100.0	100.0	100.0	100.0
Race				
White	79.3	79.1	91.4	79.7
Black	13.6	15.5	6.6	13.5
Hispanic	5.7	4.9	1.7	5.5
Other	1.5	0.5	0.3	1.4
Total	100.0	100.0	100.0	100.0
Sex				
Male	49.0	45.4	49.3	48.7
Female	51.0	54.6	50.7	51.3
Total	100.0	100.0	100.0	100.0
Size of community				
Big cities	14.4	46.3	38.5	17.9
Fringes	23.6	15.8	37.9	23.5
Medium cities	13.2	15.8	8.8	13.2
Small places	48.8	22.2	14.7	45.3
Total	100.0	100.0	100.0	100.0
Region				
Northeast	23.0	42.8	15.2	24.3
Southeast	25.1	7.7	29.3	23.8
Central	23.4	41.0	23.1	26.6
West	26.6	8.5	32.3	25.3
Total	100.0	100.0	100.0	100.0
Type of community				
Rural	9.2	8.8	12.0	9.2
Disadvantaged urban	11.2	1.8	0.0	10.0
Advantaged urban	7.1	32.6	54.4	11.0
Other	72.5	56.8	33.6	69.8
Total	100.0	100.0	100.0	100.0

Reading Achievement

Table 2 presents mean reading performance percentages for students in public and private schools. Nationally, the difference is about 7 percentage points at age 9, 8 points at age 13 and 6 points at age 17 in favor of the private schools.

The differences are greater or less in some parts of the country and among some populations. For instance, at age 9, there is a 16.4-point difference for students living in the Southeast and a 7.3-point difference for black children. However, at age 13, there is little apparent difference between public and private schools in the Central states, between students attending schools in advantaged areas, or between students whose parents have post high school education.

Looking at the unadjusted data for all three ages, it appears that, given the students they currently serve:

- Private school students' reading performance is better than public school students', on the average.
- The private school advantage is generally greatest in the Southeastern and Western regions, and next-greatest in the Northeastern states.
- There is little apparent difference between public and private school students attending schools in advantaged-urban areas, and there is only a slight difference for students whose parents have a post-high-school education.
- Both males and females in private schools do better than they do in public schools, but the difference is greater for males.
- The private junior and senior high school advantage is larger for schools in high population metropolitan areas than in smaller cities and towns.
- Black 9-, 13- and 17-year-olds in private schools perform better than those in public schools.

After adjustment for the fact that public and private schools serve unequal proportions of students from various socioeconomic strata, national differences are considerably reduced to less than 3 percentage points at ages 9 and 13 and 4 percentage points at age 17. Southeastern students in private schools continue to show a large statistically significant advantage (more than twice the predicted standard error), as do private school black teenagers,

Western teenagers, males and 17-year-olds in northeastern private schools. Other group differences shrink considerably after adjustment, but remain significant.

Table 3 presents similar results for a subset of reading assessment exercises used to measure changes in reading skills since 1970. Again, the unadjusted differences are in favor of private schools. But after adjustment, almost all differences disappear or become statistically nonsignificant except in the Southeast at age 9, the West at age 13, the Northeast at age 17 and except for males in the oldest age group.

We do not know why the national private school advantage disappears after the change results are adjusted but not after the full reading assessment data are adjusted. Further comparisons of public and private school students in academic and vocational curriculums may shed more light on this.

TABLE 2. Mean Achievement for Public and Private Students for Three Ages and Selected Groups, 1979-80 Reading Assessment[1]

	Age 9			Age 13			Age 17		
	Public/ Private[2] Difference	Predicted[3] Standard Error	Adjusted[4] Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference
Nation	6.9%	0.91%	(2.5%)	8.2%	0.79%	(2.7%)	6.4%	0.81%	(3.6%)
Region									
Northeast	4.0	1.40	(0.6)	7.0	1.16	(3.0)	8.2	1.21	(6.2)
Southeast	16.4	1.77	(10.2)	10.5	1.70	(7.4)	7.9	2.13	(5.4)
Central	1.4	1.34	(-0.1)	4.0	1.27	(0.0)	2.2	1.21	(0.3)
West	10.6	2.23	(3.4)	10.8	1.37	(4.3)	8.5	1.40	(4.6)
Sex									
Male	8.2	1.16	(3.4)	9.2	1.02	(3.4)	8.4	0.96	(5.0)
Female	5.9	1.19	(1.4)	7.1	1.00	(2.0)	4.4	1.14	(1.8)
Community size[5]									
BC+F	7.9	1.14	(2.2)	9.9	0.97	(2.9)	8.0	1.00	(4.4)
MC+SP	7.2	1.24	(3.7)	6.9	1.08	(2.8)	5.2	1.09	(3.1)
Type of community[6]									
Advantaged urban	3.5	1.64	(3.5)	1.7	1.30	(1.8)	2.9	1.53	(2.9)
Parental education[7]									
NHS+GHS	6.4	1.47	(2.2)	9.3	1.22	(4.9)	6.3	1.18	(4.3)
PHS	6.0	1.23	(1.9)	4.4	0.94	(1.5)	3.6	0.96	(2.9)
Race									
White	5.4	0.98	(2.2)	6.1	0.85	(2.2)	4.4	0.86	(3.0)
Black	7.3	2.53	(3.2)	13.1	1.73	(5.9)	8.8	2.30	(5.6)

[1] *Reading performance was assessed with 249 reading items at age 9, 323 items at age 13 and 291 items at age 17. The items assessed literal comprehension, inferential comprehension and reference skills. The data are for reading only. Public/private differences may be smaller or larger in other subject areas.*

[2] *The private schools assessed included Catholic (70%) and non-Catholic (30%) schools. Although many of the non-Catholic schools were church-related or supported, very few were Christian-fundamentalist schools.*

[3] *The standard error of the difference is an estimate of the potential sampling variability. Generally, if the difference is at least twice its standard error, we are very confident that it is a real difference and not an artifact of sampling variation.*

[4] *The "adjusted" difference is the difference that would probably exist between public and private schools, if public schools were serving the same population of students as private schools. Table 2 shows that they are not.*

[5] *Community size: big cities (population 200,000+) and the fringes around them -- (BC+F); and medium cities (population 25,000-200,000) and small places (population below 25,000) combined -- (MC+SP).*

[6] *Type of community: advantaged-urban -- schools in or around cities having populations greater than 200,000 and serving communities in which a high proportion of the residents are in professional or managerial positions.*

[7] *Parental education: students neither of whose parents graduated from high school (NHS) are combined with students who had at least one parent graduating from high school (GHS) to create one category. A second category, post high school (PHS), includes students who had at least one parent educated beyond high school.*

TABLE 3. Mean Achievement for Public and Private Students for Three Ages and Selected Groups, 1979-80 Reading Change Assessment[1]

	Age 9			Age 13			Age 17		
	Public/ Private[2] Difference	Predicted[3] Standard Error	Adjusted[4] Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference
Nation	5.1%	1.5%	(1.4%)	5.7%	1.3%	(2.4%)	6.5%	1.5%	(2.8%)
Region									
Northeast	2.9	2.3	(0.8)	4.2	2.2	(2.9)	10.4	2.4	(6.7)
Southeast	10.8	2.8	(9.6)	5.4	3.2	(3.6)	*	*	
Central	-0.4	2.3	(1.0)	2.0	2.2	(-0.3)	1.6	2.1	(-4.9)
West	*	*		9.9	2.3	(6.7)	*	*	
Sex									
Male	6.6	1.9	(2.0)	6.7	1.8	(1.9)	8.8	1.9	(4.6)
Female	3.9	2.0	(1.2)	4.6	1.7	(2.8)	3.6	2.1	(0.5)
Community size[5]									
BC+F	4.0	2.0	(-0.3)	7.7	1.6	(3.2)	7.5	1.9	(1.2)
MC+SP	5.6	1.9	(2.5)	3.9	2.1	(1.7)	6.2	2.1	(4.7)
Type of community[6]									
Advantaged urban	1.0	3.2	(-1.2)	0.8	2.4	(2.5)	1.1	3.4	(-0.9)
Parental education[7]									
NHS+GHS	4.0	2.5	(1.3)	6.6	2.1	(4.1)	6.7	2.2	(2.5)
PHS	4.4	2.0	(1.1)	2.3	1.6	(0.9)	3.9	1.8	(3.1)
Race									
White	3.5	1.6	(0.8)	3.8	1.5	(2.0)	5.0	1.6	(2.4)
Black	9.7	4.2	(8.1)	11.5	3.0	(4.7)	6.2	4.4	(3.4)

[*]Sample sizes too low to permit reliable estimates.

[1]Reading performance was assessed with 58 reading items at age 9, 71 items at ages 13 and 17. The items assessed literal comprehension, inferential comprehension and reference skills. The data are for reading only. Public/private differences may be smaller or larger in other subject areas.

[2]The private schools assessed included Catholic (70%) and non-Catholic (30%) schools. Although many of the non-Catholic schools were church-related or supported, very few were Christian-fundamentalist schools.

[3]The standard error of the difference is an estimate of the potential sampling variability. Generally, if the difference is at least twice its standard error, we are very confident that it is a real difference and not an artifact of sampling variation.

[4]The "adjusted" difference is the difference that would probably exist between public and private schools, if public schools were serving the same population of students as private schools. Table 2 shows that they are not.

[5]Community size: big cities (population 200,000+) and the fringes around them -- (BC+F); and medium cities (population 25,000-200,000) and small places (population below 25,000) combined -- (MC+SP).

[6]Type of community: advantaged-urban -- schools in or around cities having populations greater than 200,000 and serving communities in which a high proportion of the residents are in professional or managerial positions.

[7]Parental education: students neither of whose parents graduated from high school (NHS) are combined with students who had at least one parent graduating from high school (GHS) to create one category. A second category, post high school (PHS), includes students who had at least one parent educated beyond high school.

Mathematics Achievement

Table 4 displays differences between public and private schools on the 1977-78 mathematics assessment. Again, the private school students hold a general advantage of 5.2 to 7.5 points, and for some population groups, the advantage is greater than for others.

- At age 9, the private school advantage is greatest for students in big cities (10.2 percentage points), children of parents who have no high school education (10.3), blacks (8.4) and students living in the Western states (8.5). There is no statistically significant difference for students from the Central states or from suburban areas.

- At ages 13 and 17, the private school advantage is greatest for blacks (14.7 and 12.2 percentage points, respectively), Southeastern students (12.5 and 12.6), and big-city residents (12.9 and 9.2).

- The private school advantage in mathematics is greater for males than females, especially in high school.

- There is no appreciable private school advantage for students attending advantaged-urban schools.

After adjustment, the national differences become statistically nonsignificant. A private school advantage remains for teenagers from the Southeast, those attending schools in big cities and black teenagers. Similarly, 17-year-olds attending private schools in advantaged urban areas have an advantage over their public school counterparts. But public school 13-year-olds in medium-sized cities hold a slight advantage over those in the private schools.

TABLE 4. Mean Achievement for Public and Private Students for Three Ages and Selected Groups, 1977-78 Mathematics Assessment[1]

	Age 9			Age 13			Age 17		
	Public/ Private[2] Difference	Predicted[3] Standard Error	Adjusted[4] Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference	Public/ Private Difference	Predicted Standard Error	Adjusted Difference
Nation	6.2%	1.1%	(1.5%)	7.5%	0.9%	(1.4%)	5.2%	1.0%	(0.8%)
Region									
Northeast	5.0	1.9	(3.1)	3.6	1.3	(0.3)	4.1	1.4	(-0.6)
Southeast	7.0	2.7	(-1.1)	12.5	2.1	(5.0)	12.6	2.2	(8.2)
Central	2.4	1.5	(0.6)	5.7	1.4	(1.4)	4.2	1.6	(1.5)
West	8.5	2.9	(2.5)	*	*	*	2.4	2.0	(-1.1)
Sex									
Male	6.4	1.5	(1.7)	8.6	1.2	(2.0)	8.5	1.2	(3.0)
Female	6.0	1.5	(1.2)	6.6	1.2	(0.9)	2.8	1.2	(-1.2)
Community size[5]									
Big cities	10.2	1.7	(3.0)	12.9	1.2	(3.3)	9.2	1.3	(3.0)
Fringes	3.8	2.1	(0.5)	1.6	1.6	(-0.6)	2.4	2.0	(-1.3)
Medium cities	*	*	*	-0.9	2.4	(-5.4)	*	*	*
Small places	4.3	1.7	(0.8)	*	*	*	*	*	*
Type of community[6]									
Advantaged urban	-0.9	2.0	(-0.9)	0.8	1.6	(0.9)	4.0	1.7	(3.9)
Parental education[7]									
Not graduated high school	10.3	4.1	(5.7)	11.8	2.9	(6.9)	7.1	2.5	(4.5)
Graduated high school	4.9	2.1	(-0.1)	6.1	1.4	(1.5)	3.4	1.5	(0.3)
Post high school	5.1	1.6	(0.8)	3.9	1.2	(0.1)	2.7	1.2	(0.5)
Race									
White	4.2	1.2	(1.4)	4.9	1.0	(1.0)	3.6	1.0	(0.3
Black	8.4	3.4	(1.9)	14.7	3.4	(10.3)	12.2	3.2	(8.7)
Hispanic	*	*	*	7.2	3.8	(0.4)	6.2	3.0	(-1.6)
Other	*	*	*	*	*	*	*	*	*

*Sample size too low to permit reliable estimates.

[1]*The mathematics assessment consisted of hundreds of items assessing mathematical knowledge, skills, understanding and application.*

[2]*The private schools assessed included Catholic (70%) and non-Catholic (30%) schools. Although many of the non-Catholic schools were church-related or supported, very few were Christian-fundamentalist schools.*

[3]*The standard error of the difference is an estimate of the potential sampling variability. Generally, if the difference is at least twice its standard error, we are very confident that it is a real difference and not an artifact of sampling variation.*

[4]*The "adjusted" difference is the difference that would probably exist between public and private schools, if public schools were serving the same population of students as private schools. Table 3 shows that they are not.*

[5]*Community size: big cities = population 100,000+; fringes = fringes around big cities; medium cities = population 25,000-100,000; small places = population below 25,000.*

[6]*Type of community: advantaged-urban -- schools in or around cities having populations greater than 100,000 and serving communities in which a high proportion of the residents are in professional or managerial positions.*

[7]*Parental education -- not graduated from high school = neither parent graduated; graduated from high school = at least one parent graduated; post high school = one parent has had some post high school education.*

In conclusion, it appears that, nationally, private school students are performing somewhat better than public school students in reading and mathematics, although the advantage is greater or less in different parts of the country and for different groups of students. It also appears that a considerable proportion of that advantage can be accounted for by the fact that private schools serve a population quite different in its socioeconomic makeup than the population attending public schools.

These are averages, of course, and may not reflect public/private school differences in any particular area.

The National Assessment will continue to study public/private school student characteristics and achievement levels in various subjects. Future analyses will examine students taking academic or vocational courseloads in public and private schools and will link NAEP data to other data bases relevant to the study of this issue.

TABLE 5. Sample Characteristics

	Total	Age 9	Age 13	Age 17
READING				
Number of students	104,001	29,097	38,812	36,092
Number of exercises in summary mean		249	322	291
Number of schools				
Total	1,690	561	536	593
Public	1,447	489	418	540
Private	243	72	118	53
MATH				
Number of students	63,407	14,696	24,155	24,556
Number of exercises in summary mean		386	633	654
Number of schools				
Total	1,377	466	445	466
Public	1,186	402	367	417
Private	191	64	78	49
READING CHANGE				
Number of students	23,938	7,894	8,337	7,707
Number of exercises in summary mean		58	71	71
Number of schools				
Total	1,092	341	315	436
Public	982	308	266	408
Private	110	33	49	28

For More Information

Procedural Handbook: 1977-78 Mathematics Assessment, Report no. 09-MA-40. Denver, Colo.: National Assessment of Educational Progress, Education Commission of the States, 1980. ERIC no. ED 186 280. ISBN 0-89398-143-5.

Procedural Handbook: 1979-80 Reading and Literature Assessment, Report no. 11-RL-40. Denver, Colo.: National Assessment of Educational Progress, Education Commission of the States, 1981. ISBN 0-89398-221-0.